Apprenticeship and Industry Training

Roofer

Apprenticeship Course Outline

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Government of Alberta

Apprenticeship and Industry Training

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Roofer
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Apprenticeship

Apprenticeship is post-secondary education with a difference. Apprenticeship begins with finding an employer. Employers hire apprentices, pay their wages and provide on-the-job training and work experience. Approximately 80 per cent of an apprentice's time is spent on the job under the supervision of a certified journeyperson or qualified tradesperson. The other 20 per cent involves technical training provided at, or through, a post-secondary institution – usually a college or technical institute.

To become certified journeypersons, apprentices must learn theory and skills, and they must pass examinations. Requirements for certification—including the content and delivery of technical training—are developed and updated by the Alberta Apprenticeship and Industry Training Board on the recommendation of Roofer Provincial Apprenticeship Committee.

The graduate of the Roofer apprenticeship program is a certified journeyperson who will be able to:

- understand the principles and practices of roofing
- know the characteristics and to understand the actions and interactions of roofing materials
- interpret plans and specifications and to layout and develop projects accordingly
- calculate material and quantities
- use hand tools and powered equipment in a proper and safe manner
- relate to the work of other tradesmen in the construction industry
- perform assigned tasks in accordance with quality and production standards required by industry

Apprenticeship and Industry Training System

Industry-Driven

Alberta's apprenticeship and industry training system is an industry-driven system that ensures a highly skilled, internationally competitive workforce in more than 50 designated trades and occupations. This workforce supports the economic progress of Alberta and its competitive role in the global market. Industry (employers and employees) establishes training and certification standards and provides direction to the system through an industry committee network and the Alberta Apprenticeship and Industry Training Board. The Alberta government provides the legislative framework and administrative support for the apprenticeship and industry training system.

Alberta Apprenticeship and Industry Training Board

The Alberta Apprenticeship and Industry Training Board provides a leadership role in developing Alberta's highly skilled and trained workforce. The board's primary responsibility is to establish the standards and requirements for training and certification in programs under the Apprenticeship and Industry Training Act. The board also provides advice to the Minister of Advanced Education and Technology on the needs of Alberta's labour market for skilled and trained workers, and the designation of trades and occupations.

The thirteen-member board consists of a chair, eight members representing trades and four members representing other industries. There are equal numbers of employer and employee representatives.

Industry Committee Network

Alberta's apprenticeship and industry training system relies on a network of industry committees, including local and provincial apprenticeship committees in the designated trades, and occupational committees in the designated occupations. The network also includes other committees such as provisional committees that are established before the designation of a new trade or occupation comes into effect. All trade committees are composed of equal numbers of employer and employee representatives. The industry committee network is the foundation of Alberta's apprenticeship and industry training system.

Local Apprenticeship Committees (LAC)

Wherever there is activity in a trade, the board can set up a local apprenticeship committee. The board appoints equal numbers of employee and employer representatives for terms of up to three years. The committee appoints a member as presiding officer. Local apprenticeship committees:

- monitor apprenticeship programs and the progress of apprentices in their trade, at the local level
- make recommendations to their trade's provincial apprenticeship committee (PAC) about apprenticeship and certification in their trade
- promote apprenticeship programs and training and the pursuit of careers in their trade
- make recommendations to the board about the appointment of members to their trade's PAC
- help settle certain kinds of disagreements between apprentices and their employers
- carry out functions assigned by their trade's PAC or the board

Provincial Apprenticeship Committees (PAC)

The board establishes a provincial apprenticeship committee for each trade. It appoints an equal number of employer and employee representatives, and, on the PAC's recommendation, a presiding officer - each for a maximum of two terms of up to three years. Most PACs have nine members but can have as many as twenty-one. Provincial apprenticeship committees:

- Make recommendations to the board about:
    - standards and requirements for training and certification in their trade
    - courses and examinations in their trade
    - apprenticeship and certification
    - designation of trades and occupations
    - regulations and orders under the Apprenticeship and Industry Training Act
- monitor the activities of local apprenticeship committees in their trade
- determine whether training of various kinds is equivalent to training provided in an apprenticeship program in their trade
- promote apprenticeship programs and training and the pursuit of careers in their trade
- consult with other committees under the Apprenticeship and Industry Training Act about apprenticeship programs, training and certification and facilitate cooperation between different trades and occupations
- consult with organizations, associations and people who have an interest in their trade and with employers and employees in their trade
- may participate in resolving certain disagreements between employers and employees
- carry out functions assigned by the board

Roofer PAC Members at the Time of Publication

Mr. R. James	Calgary	Presiding Officer
Mr. N. Sims Sr.	Calgary	Employer
Mr. S. Teal	Calgary	Employer
Mr. M. Jarosch	Edmonton	Employer
Mr. M. Lloyd	Edmonton	Employer
Mr. C. Morgan	Calgary	Employee
Mr. J. Fraser	Edmonton	Employee
Mr. J. Lindberg	Edmonton	Employee
Mr. R. Tanaka	Lethbridge	Employee

Alberta Government

Alberta Advanced Education and Technology works with industry, employer and employee organizations and technical training providers to:

- facilitate industry's development and maintenance of training and certification standards
- provide registration and counselling services to apprentices and employers
- coordinate technical training in collaboration with training providers
- certify apprentices and others who meet industry standards

Technical Institutes and Colleges

The technical institutes and colleges are key participants in Alberta's apprenticeship and industry training system. They work with the board, industry committees and Alberta Advanced Education and Technology to enhance access and responsiveness to industry needs through the delivery of the technical training component of apprenticeship programs. They develop lesson plans from the course outlines established by industry and provide technical training to apprentices.

Apprenticeship Safety

Safe working procedures and conditions, incident/injury prevention, and the preservation of health are of primary importance in apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of government, employers, employees, apprentices and the public. Therefore, it is imperative that all parties are aware of circumstances that may lead to injury or harm.

Safe learning experiences and healthy environments can be created by controlling the variables and behaviours that may contribute to or cause an incident or injury. By practicing a safe and healthy attitude, everyone can enjoy the benefit of an incident and injury free environment.

Alberta Apprenticeship and Industry Training Board Safety Policy

The Alberta Apprenticeship and Industry Training Board fully supports safe learning and working environments and encourages the teaching of proper safety procedures both within trade specific training and in the workplace.

Trade specific safety training is an integral component of technical training, while ongoing or general non-trade specific safety training remains the responsibility of the employer and the employee as required under workplace health and safety legislation.

Workplace Responsibilities

The employer is responsible for:

- training employees and apprentices in the safe use and operation of equipment
- providing and maintaining safety equipment, protective devices and clothing
- enforcing safe working procedures
- providing safeguards for machinery, equipment and tools
- observing all accident prevention regulations

The employee and apprentice are responsible for:

- working in accordance with the safety regulations pertaining to the job environment
- working in such a way as not to endanger themselves, fellow employees or apprentices

Workplace Health and Safety

A tradesperson is often exposed to more hazards than any other person in the work force and therefore should be familiar with and apply the Occupational Health and Safety Act, Regulations and Code when dealing with personal safety and the special safety rules that apply to all daily tasks.

Workplace Health and Safety (Alberta Employment, Immigration and Industry) conducts periodic inspections of workplaces to ensure that safety regulations for industry are being observed.

Additional information is available at www.worksafely.org

Technical Training

Apprenticeship technical training is delivered by the technical institutes and many colleges in the public post-secondary system throughout Alberta. The colleges and institutes are committed to delivering the technical training component of Alberta apprenticeship programs in a safe, efficient and effective manner. All training providers place great emphasis on safe technical practices that complement safe workplace practices and help to develop a skilled, safe workforce.

The following institutions deliver Roofer apprenticeship technical training:

Northern Alberta Institute of Technology

Procedures for Recommending Revisions to the Course Outline

Advanced Education and Technology has prepared this course outline in partnership with the Roofer Provincial Apprenticeship Committee.

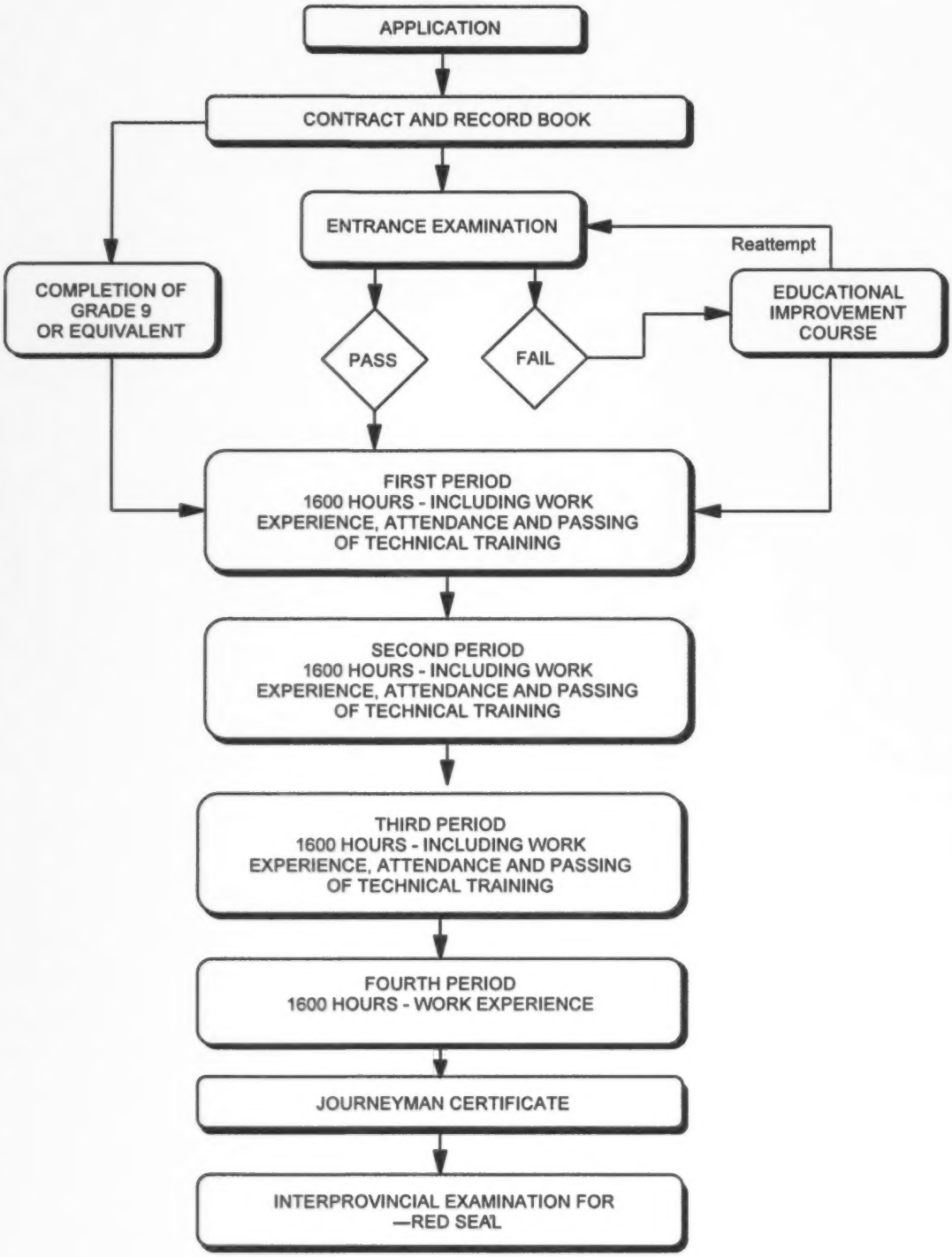
This course outline was approved on March 26, 2004 by the Alberta Apprenticeship and Industry Training Board on a recommendation from the Provincial Apprenticeship Committee. The valuable input provided by representatives of industry and the institutions that provide the technical training is acknowledged.

Any concerned individual or group in the province of Alberta may make recommendations for change by writing to:

Roofer Provincial Apprenticeship Committee
c/o Industry Programs and Standards
Apprenticeship and Industry Training
Advanced Education and Technology
10th floor, Commerce Place
10155 102 Street NW
Edmonton AB T5J 4L5

It is requested that recommendations for change refer to specific areas and state references used. Recommendations for change will be placed on the agenda for regular meetings of the Roofer Provincial Apprenticeship Committee.

Apprenticeship Route toward Certification


APPLICATION
CONTRACT AND RECORD BOOK
ENTRANCE EXAMINATION
Reattempt
COMPLETION OF GRADE 9 OR EQUIVALENT
PASS
FAIL
EDUCATIONAL IMPROVEMENT COURSE
FIRST PERIOD
1600 HOURS - INCLUDING WORK EXPERIENCE, ATTENDANCE AND PASSING OF TECHNICAL TRAINING
SECOND PERIOD
1600 HOURS - INCLUDING WORK EXPERIENCE, ATTENDANCE AND PASSING OF TECHNICAL TRAINING
THIRD PERIOD
1600 HOURS - INCLUDING WORK EXPERIENCE, ATTENDANCE AND PASSING OF TECHNICAL TRAINING
FOURTH PERIOD
1600 HOURS - WORK EXPERIENCE
JOURNEYMAN CERTIFICATE
INTERPROVINCIAL EXAMINATION FOR —RED SEAL

Roofer Training Profile
FIRST PERIOD
(6 Weeks 30 Hours Per Week – Total of 180 Hours)

SECTION ONE

INTRODUCTORY THEORY: LOW & STEEP SLOPE

47 HOURS

A	B	C
Introduction to the Roofing Industry 1 Hour	Terminology 1 Hour	Safe Work Practices and Safety Regulations 8 Hours
D	**E**	**F**
Introduction to W.H.M.I.S. (Workplace Hazardous Materials Information System) 1 Hour	Transportation of Dangerous Goods Control 1 Hour	Workplace Health and Safety (OHS) and Alberta Construction Safety Association 1 Hour
G	**H**	**I**
Human Resources Canada 1 Hour	Apprenticeship and Industry Training Act 1 Hour	Roof Structures and Loading 2 Hours
J	**K**	**L**
Types of Roof Structures 2 Hours	Construction Features 1 Hour	Loading and Operation of Truck 1 Hour
M	**N**	**O**
Introduction to Roofing Tools and Equipment 8 Hours	Roofing Materials 12 Hours	Premature Roof Failures 2 Hours
P	**Q**	
Introduction to Composition Shingles 2 Hours	Introduction to Softwood Shingles 2 Hours	

SECTION TWO

SHOP WORK: FIELD SEAMS & STEEP ROOFING

83 HOURS

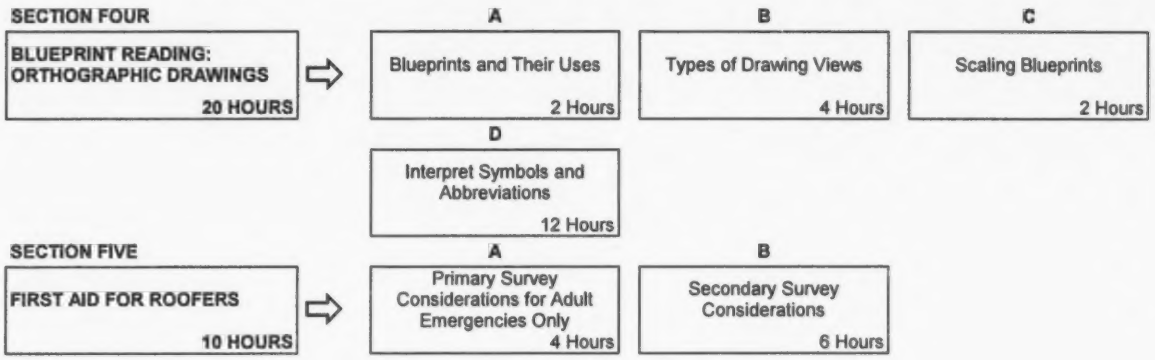
A	B	C
Safety 8 Hours	Work Ethics Ongoing	Shop Introduction 4 Hours
D	**E**	**F**
Roof Inspections, Repair and Surveys (Off Campus) 6 Hours	Kettles and Burners 3 Hours	Low Slope Roofs 32 Hours
G	**H**	
Asphalt Shingles 15 Hours	Softwood Shingles 15 Hours	

SECTION THREE

BASIC TRADE MATHEMATICS

20 HOURS

A	B	C
Calculate Using Whole Numbers 2 Hours	Calculate Using Fractions 2 Hours	Calculate Using Decimals 2 Hours
D	**E**	
Calculate Using Percentages 2 Hours	Calculate Perimeter, Areas and Volumes 12 Hours	


SECTION FOUR
BLUEPRINT READING: ORTHOGRAPHIC DRAWINGS
20 HOURS
A
Blueprints and Their Uses
2 Hours
B
Types of Drawing Views
4 Hours
C
Scaling Blueprints
2 Hours
D
Interpret Symbols and Abbreviations
12 Hours
SECTION FIVE
FIRST AID FOR ROOFERS
10 HOURS
A
Primary Survey Considerations for Adult Emergencies Only
4 Hours
B
Secondary Survey Considerations
6 Hours

SECOND PERIOD
(6 Weeks 30 Hours Per Week – Total of 180 Hours)

SECTION ONE

INTERMEDIATE THEORY: LOW SLOPE MEMBRANES
48 HOURS

A	B	C
Safety 12 Hours	Tools and Equipment Operations 1 Hour	Roofing Specifications 1 Hour
D	**E**	**F**
Roof Failures 2 Hours	Re-roofing 2 Hours	Waterproofing and Damproofing 2 Hours
G	**H**	**I**
Hot Asphalt—Built-Up Roofing—Introduction 6 Hours	Roofing Application for Other Membranes 12 Hours	Roofing During Inclement Weather 1 Hour
J	**K**	**L**
Roof Drainage 1 Hour	Softwood Shakes 4 Hours	Rigging 4 Hours

SECTION TWO

SHOP WORK: DETAIL WORK & STEEP ROOFING
96 HOURS

A	B	C
Safety 8 Hours	Tools and Equipment Ongoing	Low Slope Roof Applications 40 Hours
D	**E**	
Rigging and Rigging Equipment 10 Hours	Steep Roof Applications 38 Hours	

SECTION THREE

TRADE MATHEMATICS: INTRODUCTORY GEOMETRY
18 HOURS

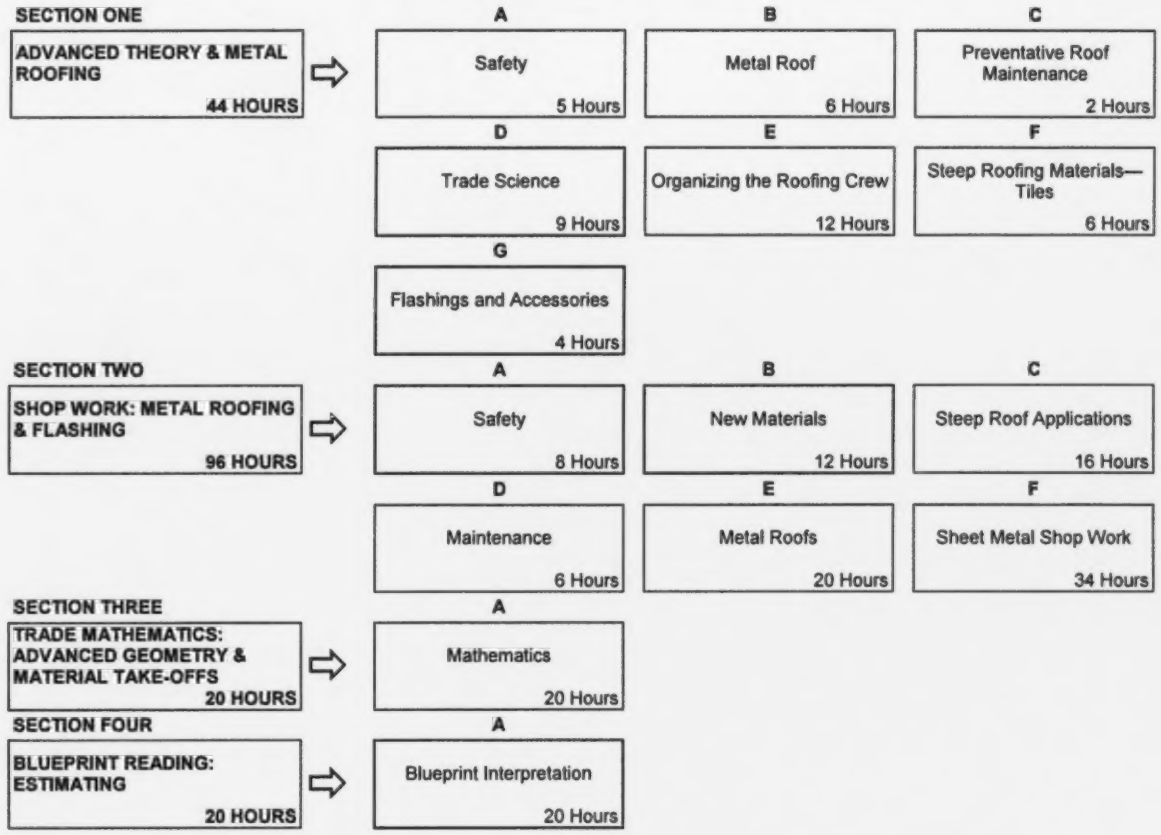
A	B
Mathematics 9 Hours	Estimating 9 Hours

SECTION FOUR

INTERPRETING BLUEPRINTS
18 HOURS

A	B
Blueprint Interpretation 6 Hours	Construction Details 12 Hours

THIRD PERIOD
(6 Weeks 30 Hours Per Week – Total of 180 Hours)



NOTE: The hours stated are for guidance and should be adhered to as closely as possible. However, adjustments must be made for rate of apprentice learning, statutory holidays, registration and examinations for the training establishment and Apprenticeship and Industry Training.

FIRST PERIOD TECHNICAL TRAINING
ROOFER TRADE
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:.....INTRODUCTORY THEORY: LOW & STEEP SLOPE..... 47 HOURS

A. Introduction to the Roofing Industry ..... 1 Hour

Outcome: ***Describe the minimum standards and trade associations for roofing in Alberta.***

1. Explain the need for minimum roofing standards as required by the ARCA.
2. Explain the conditions contained regarding guarantee offered by the ARCA and the CRCA.
3. Know and describe the roofing inspection responsibility.
4. Explain the meaning of good work ethics.

B. Terminology ..... 1 Hour

Outcome: ***Communicate with industry related people and customers using industry standard terminology for materials, tools and building components.***

1. Demonstrate the use of proper terminology.
2. Name standard terms for materials, functions and components as applied to first period training.

C. Safe Work Practices and Safety Regulations ..... 8 Hours

Outcome: ***Demonstrate safe work practices at all times.***

1. List and describe proper Personal Protective Equipment (PPE).
2. Demonstrate safe work practices relating to construction sites.
3. List and describe safe work practices regarding roofing equipment and materials.
4. Identify the classes and properties of fires and fire suppression equipment.
5. Explain the responsibility of following and maintaining "Public Safety" as described by legislated restrictions.

D. Introduction to W.H.M.I.S. (Workplace Hazardous Materials Information System) ..... 1 Hour

Outcome: ***Define the role of WHMIS on the job-site.***

1. Describe what WHMIS is and its elements.
2. Define and distinguish the various types of WHMIS labels.
3. Explain what a Material Safety Data Sheet (MSDS) is and where to find the information.

E. Transportation of Dangerous Goods Control Act ..... 1 Hour

Outcome: ***Identify the role of TDG in regards to the roofing industry.***

1. Explain the employer's responsibility with regard to training.
2. Explain the employee's responsibility with regard to training.
3. Explain the exemptions under the TDG regulations as they pertain to the roofing industry.

F. Workplace Health And Safety (WHS) and Alberta Construction Safety Association (ACSA) ... 1 Hour

Outcome: ***Describe the roles of various provincial government agencies with regard to safety within the trade.***

1. Identify the Safety Regulations as they apply to the safe work practices in the roofing trade.
2. Explain the function and purpose of the branch.

G. Human Resources Canada ..... 1 Hour

Outcome: ***Describe the function of the department and its relation to the roofing apprentice.***

1. Explain the function of the department and how service is provided.
2. Describe how to apply for benefits and the conditions for receiving benefits.

H. Apprenticeship and Industry Training Act ..... 1 Hour

Outcome: ***Describe the function of the department and its relation to the roofing apprentice.***

1. Explain the role and function of the act and, its organizational pattern.
2. Describe the provisions for receiving input from management and labour.
3. Describe the purpose and use of the record book.

I. Roof Structures and Loading ..... 2 Hours

Outcome: ***Describe and identify different types of materials used for roof decks and the safe procedure for the loading of roof decks.***

1. Describe the types of materials used for roof decking including:
   a) wood
   b) concrete
   c) steel
   d) gypsum
   e) composite
2. Describe deck preparation techniques prior to roof application including:
   a) covering of holes
   b) proper securement
   c) reinforcement of openings
3. Describe the safety procedures and practices to be followed when loading materials and equipment on the roof deck.
4. Identify the strong and weak areas of a roof deck in relation to roof loading.
5. Demonstrate proper protection of loaded materials.

J. Types of Roof Structures ..... 2 Hours

Outcome: ***Describe the differences between residential type structures and commercial/industrial type structures and identify various styles and shapes.***

1. Describe the primary differences between the roofs of residential buildings and those of commercial or industrial buildings in relation to terminology.
2. List and describe common types of roof styles in both steep and low slope designs.

K. Construction Features ..... 1 Hour

Outcome: ***Identify features directly related to roofs and their construction.***

1. List and describe construction features found on various roof types.

L. Loading and Operation of Truck ..... 1 Hour

Outcome: ***Describe the sequences used for loading materials and equipment on the truck.***

1. Describe the sequence for loading material on the truck.
2. Describe the sequence and distribution of loading equipment on the truck.
3. Identify safety procedures for loading and operating loading equipment.

M. Introduction to Roofing Tools and Equipment ..... 8 Hours

Outcome: ***Identify and understand the use, maintenance and safety of roofing tools and equipment.***

1. Identify and understand the use of small hand tools.
2. List and describe the various types of lifting equipment including the specific use and safety requirements of each.
3. Identify and understand the use of on-deck roofing equipment.
4. Identify and understand the use of asphalt melting equipment and asphalt pumps.

N. Roofing Materials ..... 12 Hours

Outcome: ***Identify, list and explain the various materials used in low slope systems.***

1. List and describe the materials used in BUR.
2. List and describe the materials used in SBS/APP systems.
3. List and describe the materials used in single ply systems.
4. List and describe new materials as they become available.

O. Premature Roof Failure ..... 2 Hours

Outcome: ***List and describe the different causes and effects of premature roof failures as well as describing various repair techniques.***

1. Identify common examples of premature roof failure.
2. Describe methods used to counteract premature roof failure.
3. List and describe repair techniques for premature roof defects.

P. Introduction to Composition Shingles ..... 2 Hours

Outcome: ***Describe the various types and installation techniques for composition shingles.***

1. Identify the types of composition shingles available.
2. Describe installation techniques including underlayment and flashing requirements, new roofing and re-roofing.
3. Describe the need for proper ventilation on steep roofs.

Q. Introduction to Softwood Shingles ..... 2 Hours

Outcome: ***Describe the various types and installation techniques for softwood shingles.***

1. Identify the types and grades of softwood shingles available.
2. Describe installation techniques including underlayment and flashing requirements, new roofing and re-roofing.
3. Describe the need for proper ventilation on steep roofs.

SECTION TWO: ..... SHOP WORK: FIELD SEAMS & STEEP ROOFING ..... 83 HOURS

A. Safety ..... 8 Hours

Outcome: ***Demonstrate safe work practices as it applies to shop work.***

1. Demonstrate safe work practices in shop work.
2. Demonstrate proper use of Personal Protective Equipment (PPE).
3. Complete fire extinguisher training as it relates to low slope roofs.

B. Work Ethics ..... Ongoing

Outcome: ***Demonstrate good work ethics in the shop.***

1. Demonstrate good work ethics in the shop.
2. Demonstrate a willingness to cooperate in shop projects requiring group work.

C. Shop Introduction ..... 4 Hours

Outcome: ***Practice and demonstrate aptitude in the use of shop tools.***

1. Demonstrate safe handling and use of hand tools.
2. Demonstrate safe use and handling of electrical power tools.
3. Demonstrate safe use and procedures for on-deck equipment.

D. Roof Inspection, Repair and Surveys (Off Campus) ..... 6 Hours

Outcome: ***Assess damage to existing roofs and repair work required.***

1. Demonstrate an understanding of roof inspection with regard to assessing damage and evaluating repairs.
2. Develop hand skills for applying roofing materials.

E. Kettles and Burners ..... 3 Hours

Outcome: ***Demonstrate proper start-up, use and shut down of asphalt melting equipment.***

1. Demonstrate safe practices for the start-up of kettle operations.
2. Practice safe work procedures when handling and using "hot" products.
3. Demonstrate safe practices for the shutdown of asphalt melting equipment.

F. Low Slope Roofs ..... 32 Hours

Outcome: ***Establish proficiency with applying low slope membranes and using low slope on-deck and safety equipment.***

1. Demonstrate the safe use of low slope roofing equipment.
2. Demonstrate proficiency in applying low slope roofing materials including BUR, SBS, EPDM, PVC and other new materials.

G. Asphalt Shingles ..... 15 Hours

Outcome: ***Establish proficiency in applying steep slope materials (asphalt shingles) and using steep slope safety equipment.***

1. Establish proficiency in applying asphalt shingle roofs.
2. Demonstrate the correct use of steep roofing safety systems.

H. Softwood Shingles ..... 15 Hours

Outcome: ***Establish proficiency in applying steep slope materials (softwood shingles) and using steep slope safety equipment.***

1. Establish proficiency in applying softwood shingles on steep roofs.
2. Demonstrate the correct use of tools and safety equipment.

SECTION THREE: ..... BASIC TRADE MATHEMATICS ..... 20 HOURS

A. Calculate Using Whole Numbers ..... 2 Hours

Outcome: ***Solve mathematical problems using basic arithmetic.***

1. Solve mathematical problems using whole numbers.
2. Demonstrate proficiency in the use of calculators.

B. Calculate Using Fractions ..... 2 Hours

Outcome: ***Solve problems using fractions.***

1. Solve mathematical problems using fractions.

C. Calculate Using Decimals ..... 2 Hours

Outcome: ***Solve mathematical problems using decimal numbers.***

1. Solve mathematical problems using decimal numbers.
2. Solve mathematical problems using the metric system.

D. Calculate Using Percentages ..... 2 Hours

Outcome: ***Solve problems using ratios and proportions.***

1. Solve problems using percentages.
2. Solve problems using ratios and proportions.
3. Solve ~~s~~tory-type" problems.

E. Calculate Perimeters, Areas and Volumes ..... 12 Hours

Outcome: ***Calculate geometrical trade related problems.***

1. Perform calculations using perimeter formulae on basic geometric shapes.
2. Perform calculations using area formulae on basic geometric shapes.
3. Perform calculations using volume formulae on basic geometric shapes.

SECTION FOUR: .....BLUEPRINT READING: ORTHOGRAPHIC DRAWINGS..... 20 HOURS

A. Blueprints and Their Use ..... 2 Hours

Outcome: ***Understand the need for blueprints in the construction industry.***

1. Explain the basic components of a set of working drawings.
2. Explain the relationship between blueprints and specifications.

B. Types of Drawing Views ..... 4 Hours

Outcome: ***Draw and interpret various drawing styles.***

1. Draw and interpret orthographic drawings.
2. Graphically describe the various lines used in working blueprints.

C. Scaling Blueprints ..... 2 Hours

Outcome: ***Read scale rulers in metric and imperial scales.***

1. Read scale rulers using imperial dimensions.
2. Read scale rulers using metric dimensions.
3. Draw lines using both systems.

D. Interpret Symbols and Abbreviations ..... 12 Hours

Outcome: ***Understand the symbols and abbreviations used in blueprints and, interpret drawings.***

1. Identify symbols on a set of working drawings.
2. Decipher abbreviations on a set of working drawings.
3. Interpret details from a set of working drawings.

SECTION FIVE: .....FIRST AID FOR ROOFERS ..... 10 HOURS

A. Primary Survey Considerations for Adult Emergencies Only .....4 Hours

Outcome: ***Perform emergency first aid for adult emergencies.***

1. Understand emergencies first aid ABC's (Airways, Breathing and Circulation).

B. Secondary Survey Considerations .....6 Hours

Outcome: ***Understand the prevention of falls and the treatment of secondary injuries.***

1. Demonstrate the treatment of musculoskeletal injuries.
2. Review the prevention of falls and treatment of fall related injuries.
3. Demonstrate the treatment of soft tissue injuries.
4. Review the treatment of asphalt burns.
5. Review the treatment of environmental injuries.

SECOND PERIOD TECHNICAL TRAINING
ROOFER TRADE
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:..... INTERMEDIATE THEORY: LOW SLOPE MEMBRANES..... 48 HOURS

A. Safety ..... 12 Hours

Outcome: ***Maintain safety standards as they pertain to the roofing industry.***

1. Maintain safety standards pertaining to the roofing industry.
2. Complete the industry approved —Torch Safety Course" which includes safe set-up and operation of LP gas torches, proper fire watch techniques and recording, and roof top site hazard assessments.

B. Tools and Equipment – Operations ..... 1 Hour

Outcome: ***Describe the safe operation of roofing equipment.***

1. Describe the proper use of non-powered roofing equipment.
2. Describe the safe operation of powered roofing equipment.

C. Roofing Specifications ..... 1 Hour

Outcome: ***List and explain the procedures and requirements for "good roofing practice".***

1. Describe the various manuals available to maintain minimum standards.
2. List and explain the minimum requirements.

D. Roof Failures ..... 2 Hours

Outcome: ***Describe examples and causes of roof failures.***

1. Describe examples of roof failures.
2. Explain environmental roof defects and the methods used to counteract them.
3. Explain the methods used in leak detection.
4. List the steps taken to repair existing roofs.

E. Re-roofing ..... 2 Hours

Outcome: ***Describe the sequences and safety factors regarding re-roofing existing structures.***

1. List and describe the steps to re-roof an existing building.
2. Explain the special safety issues with regard to re-roofing focusing on site hazard assessments and environmental hazards.

F. Waterproofing and Damproofing ..... 2 Hours

Outcome: ***Describe the materials used and the methods of waterproofing and damproofing.***

1. Explain the need for waterproofing/damproofing and the difference between the two systems.
2. List and describe the materials used in the processes.
3. Explain the special safety requirements for working -below grade" or -confined space".

G. Hot Asphalt Application – Built-up Roofing – Introduction ..... 6 Hours

Outcome: ***Describe the application of built-up roofs in low slope roof situations.***

1. List and describe substrate requirements for built-up roofs.
2. Describe application methods of built-up roof membranes.
3. List and describe membrane protection requirements.

H. Roofing Application for Other Membranes ..... 12 Hours

Outcome: ***Describe and identify different types of materials used for elasto-plastic membrane applications and their unique safe work practices.***

1. List and describe the different types of membranes used.
2. List and describe the application techniques unique to each system.
3. Identify the safety procedures used in the application of elasto-plastic systems.
4. Demonstrate an awareness of new technologies related to second year material.

I. Roofing During Inclement Weather ..... 1 Hour

Outcome: ***Describe the techniques and precautions used when roofing during inclement weather.***

1. Describe the techniques used to cover open roof areas during sudden weather shifts.
2. List and describe the safety procedures and equipment used on roofs with icy conditions.
3. List special procedures used during cold-weather roofing.

J. Roof Drainage ..... 1 Hour

Outcome: ***Identify types and uses of roof drainage systems.***

1. Explain the differences between interior and exterior drainage systems.
2. List and describe the different types of roof drainage systems.

K. Softwood Shakes ..... 4 Hours

Outcome: ***Describe the application techniques for softwood shakes.***

1. Describe the types and grades of softwood shakes.
2. Describe the application for new roofing and re-roofing with softwood shakes.
3. Identify safety procedures and equipment when applying softwood shakes.

L. Rigging ..... 4 Hours

Outcome: ***Identify and understand the safe use of rigging equipment.***

1. Understand the relevant laws with regard to rigging and rigging equipment as dictated by W.H.&S.
2. List and describe the various types of rigging equipment.
3. Identify and understand the use of hand signals.
4. List and describe knots and splices.

SECTION TWO: ..... SHOP WORK: DETAIL WORK & STEEP ROOFING ..... 96 HOURS

A. Safety ..... 8 Hours

Outcome: ***Demonstrate safe work practices as it applies to shop work.***

1. Demonstrate safe work practices in shop work pertaining to regulation changes.
2. Demonstrate proper use of Personal Protective Equipment (PPE).

B. Tools and Equipment ..... Ongoing

Outcome: ***Demonstrate proficiency in the use of tools and equipment.***

1. Demonstrate the practical application of hand tools and equipment.
2. Demonstrate the safe use of powered equipment.

C. Low Slope Roof Applications ..... 40 Hours

Outcome: ***Practice and demonstrate aptitude in the application of low slope membrane.***

1. Demonstrate safe handling and use of hand tools specific to low slope membranes. (SBS/APP, EPDM, PVC, BUR).
2. Demonstrate proper application methods for low slope membranes.
3. Demonstrate proper methodology waterproofing penetrations on low slope roofs.

D. Rigging and Rigging Equipment ..... 10 Hours

Outcome: ***Practice and demonstrate the proper use and handling of rigging equipment.***

1. Demonstrate proficiency in the assembly and disassembly of various hoists used in the industry.
2. Demonstrate the proper use of proper hoisting signals.
3. Demonstrate ability to work with ropes (knots and splices) pertaining to the trade.

E. Steep Roof Applications ..... 38 Hours

Outcome: ***Practice and demonstrate aptitude in the application of steep slope membrane.***

1. Demonstrate safe handling and use of hand tools specific to steep slope membranes. (Softwood shakes, laminated/architectural shingles).
2. Demonstrate proper application of flashings, underlayment and eave protection specific to steep roof systems.
3. Demonstrate proper application methods of steep slope membranes.

SECTION THREE: .....TRADE MATHEMATICS: INTRODUCTORY GEOMETRY..... 18 HOURS

A. Mathematics.....9 Hours

Outcome: ***Solve mathematical problems using basic arithmetic.***

1. Solve mathematical problems using basic mathematics.
2. Solve problems using geometry.
3. Solve geometrical problems using Pythagorean Theory and square roots.

B. Estimating .....9 Hours

Outcome: ***Estimate material take-offs.***

1. Estimate material take-off on steep roof situations using imperial dimensions.
2. Estimate material take-offs using metric dimensions.

SECTION FOUR: .....INTERPRETING BLUEPRINTS ..... 18 HOURS

A. Blueprint Interpretation .....6 Hours

Outcome: ***Demonstrate ability to gather relevant information from actual blueprints.***

1. Demonstrate ability to gather roofing information from working blueprints.
2. Demonstrate ability to read and interpret specifications.

B. Construction Details .....12 Hours

Outcome: ***Scale and draw various roofing details.***

1. Demonstrate ability to pictorially depict roofing details.
2. Demonstrate ability to scale drawings and details.

THIRD PERIOD TECHNICAL TRAINING
ROOFER TRADE
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:.....ADVANCED THEORY & METAL ROOFING..... 44 HOURS

A. Safety .....5 Hours

Outcome: ***Maintain safety standards as they pertain to the roofing industry.***

1. Describe safety standards as they pertain to the roofing industry.
2. Understand the requirements of safety related to employees, employers and other trades.
3. Understand the safety standards related to roofing and the public.
4. Complete industry approved —fe Risk Management" course, which includes hazard assessment and checklist/log recording.

B. Metal Roof .....6 Hours

Outcome: ***List and explain the types and application procedures for metal roofing.***

1. List the various types of metal roofs.
2. Describe the application techniques and requirements for metal roofs.
3. List and describe the tools and equipment used for installation.

C. Preventive Roof Maintenance .....2 Hours

Outcome: ***Describe and understand preventive maintenance.***

1. Explain environmental roof defects and the methods used to counteract them.
2. Explain the methods used in leak detection.
3. List the steps taken to repair existing roofs.
4. Explain the requirements of a roof survey.

D. Trade Science .....9 Hours

Outcome: ***Describe the physical and chemical classifications of roofing components.***

1. List and describe the chemical classifications of roof insulations.
2. Describe types of roof venting.
3. List and describe the physical properties of roof decks.

E. Organizing The Roofing Crew ..... 12 Hours

Outcome: ***Understand the duties and responsibilities of various members of a roofing crew. Explain the role of the industry network system.***

1. List and describe the various members of a roofing crew; both direct and indirect.
2. Demonstrate effective and efficient use of materials and labour on a roofing crew.
3. Understand and participate in "Workplace Coaching Skills" program.
4. Explain the role and purpose of the PAC (Provincial Apprenticeship Committee) in the roofer trade.

F. Steep Roofing Materials – Tiles ..... 6 Hours

Outcome: ***Describe the application of steep slope roofing tiles and slates.***

1. List and describe substrate requirements for concrete and metal tiles.
2. Describe application methods for concrete and metal tiles.
3. List and describe safety procedures for working on tile roofs.

G. Flashings and Accessories ..... 4 Hours

Outcome: ***Describe and identify different types of materials used for the fabrication and application of metal flashings.***

1. List and describe the different types of metals used for flashings.
2. Describe the techniques used for fabrication and layout.
3. Describe the minimum requirements for the application of metal flashings.

SECTION TWO: ..... SHOP WORK: METAL ROOFING & FLASHING ..... 96 HOURS

A. Safety ..... 8 Hours

Outcome: ***Demonstrate safe work practices as it applies to shop work.***

1. Demonstrate safe work practices in shop work as it pertains to changes in regulations.
2. Demonstrate proper use of Personal Protective Equipment (PPE).

B. New Materials ..... 12 Hours

Outcome: ***Practice and demonstrate aptitude in the application of new materials or systems.***

1. Demonstrate safe handling and use of new roofing systems or materials as introduced (i.e. TPO, CSPE).
2. Demonstrate proper application methods of new membranes.
3. Demonstrate proper safety procedures of new systems.

C. Steep Roof Applications ..... 16 Hours

Outcome: ***Practice and demonstrate aptitude in the application of steep slope systems i.e. concrete tiles, metal tiles.***

1. Demonstrate safe handling and use of hand tools specific to steep slope membranes (concrete tiles, metal tiles).
2. Demonstrate proper application of flashings, underlayment and eave protection specific to steep roof systems.
3. Demonstrate proper application methods of steep slope membranes.

D. Maintenance ..... 6 Hours

Outcome: ***Describe and perform maintenance tasks to roofing equipment.***

1. Perform routine on-deck maintenance to roofing equipment.
2. Demonstrate proper techniques to perform maintenance on small engines.
3. Describe troubleshooting routines on small engines.

E. Metal Roofs ..... 20 Hours

Outcome: ***Demonstrate ability to apply metals roofs.***

1. Describe and properly utilize metal roofing safety equipment.
2. Demonstrate ability to apply underlayment and eave protection.
3. Demonstrate ability to properly install metal roofing and associated flashings.

F. Sheet Metal Shop Work ..... 34 Hours

Outcome: ***Demonstrate ability to fabricate and install metal flashings.***

1. Describe and properly utilize metal flashing fabrication equipment safely.
2. Demonstrate ability to layout and fabricate metal flashings.
3. Demonstrate ability to properly install metal flashings on the roof.

SECTION THREE: TRADE MATHEMATICS: ADVANCED GEOMETRY & MATERIAL TAKE-OFFS .. 20 HOURS

A. Mathematics ..... 20 Hours

Outcome: ***Estimate material for various roof styles and materials.***

1. Solve mathematical problems using basic mathematics.
2. Estimate materials for low slope roof covered with various materials.
3. Estimate flashing amounts on low slope roofs.

SECTION FOUR: ..... BLUEPRINT READING: ESTIMATING ..... 20 HOURS

A. Blueprint Interpretation ..... 20 Hours

Outcome: ***Demonstrate ability to list on-site requirements using blueprints and specifications.***

1. Demonstrate ability to list roofing materials and information from working blueprints.
2. Demonstrate ability to read and interpret specifications used in conjunction with blueprints.

Excellence through training and experience

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